Design Standards Letter

Letter Number: G-1998-07

Letter Date: 06/12/1998

Effective Date: 06/12/1998

Section/Plan No.: None

Subject: Payment of Bituminous Mixtures by Square Meters (Square Yards) and Megagrams (Tons)

Body

The purpose of this letter is to make designers aware of a significant policy change. Effective October 1, 1998, payment of bituminous mixtures on full depth pavements should be by the square meter (square yard), and on resurfacing projects by megagrams (tons) for bituminous mixtures. Attached are copies of the job special provisions that should be used to implement this new policy. The attached special provisions can be found in the Lotus Notes job special provision database. Please incorporate these special provisions into any project to be let after October 1, 1998, specifying bituminous mixtures. New bid items are being established and will be made available in the near future.

For preliminary estimating purposes, an adjustment factor is provided under explanatory notes within the job special provision database. In addition, the designer should be aware that note, the factors provided in the Policy, Procedures and Design Manual Figure 6-07.1 for each mixture are only estimated values based on statewide averages, and again are only provided for preliminary estimating purposes. Factors based upon local mix designs should be inserted into the special provisions by the designers. Mix designs have been established for most rock formations. The designer should request from district Materials personnel what factors should be used for each mixture on a job when preparing their final estimate.

It is critical for the designer to obtain the percent of asphalt cement expected for each mixture and the current price of the asphalt cement at the time of preparing the final estimate for submittal to the support center. Inaccurate percentages or asphalt cement prices could result in significant costs to the contractor or the department.

This change in policy is being initiated to provide similar payment of bituminous mixtures as portland cement concrete pavements and to provide a historical database, so we as a department may track bituminous mixture costs.

If you have any questions, please direct them to Pat McDaniel, via Lotus Notes (mcdanp) or by telephone at (573) 526-2903.

pm/vh

Attachments

Job Special Provision

Job:

Title: Payment of Bituminous Mixtures by Ton

Name: PBMT

ID Number: DSP-98-09

First Effective Bid Opening Date: 10/98

Last Effective Bid Opening Date:

Revision Date: 06/11/98

Explanatory Notes: For preliminary estimating purposes, use an adjustment factor of $150.70/ton for mixes with PG 64-22 or PG 58-22; $213.70/ton for mixes with PG 70-22, PG 64-28 and PG 58-34; $219.70/ton for mixes with PG 70-28 or PG76-22; and $255.70/ton for mixes with PG76-28. These factors, as well as the factors provided in Figure 6-07.1 of the PPDM for each mix, are statewide averages. The factors to be inserted by the designer into the table under Sec 3.1 of this special provision should reflect current asphalt cement costs and the best estimate for the asphalt cement content for each specific mix to be used on the project. Costs for each performance grade asphalt cement are readilly available through the district or can be requested from the support center Design Division. Mix designs have been established for most rock formations and the designer should request specific factor recommendations from district material personnel. Great effort should be taken to insure the costs and asphalt cement contents inserted into this provision are accurate as possible. Eroneous factors could result in significant costs to the contractor or department.

Units: English

Section: 0403 - Asphaltic Concrete Pavement

PAYMENT OF BITUMINOUS MIXTURES BY TON

1.0 Scope. All bituminous mixtures used in resurfacing existing pavements and shoulders on this project will be paid for by mix type, not by components of each mix. This provision modifies only as stated herein the method of measurement and basis of payment, and does not alter any other requirements set forth in Sections 301, 401, 402 or 403 of the Standard Specifications for the bituminous mixtures used for resurfacing.

2.0 Method of Measurement. The weight of the mixture will be determined in accordance with Section 403.23.1 of the standards specifications, to the nearest 0.1 ton for the total quantity used in the accepted work. No separate measurement for the weight of asphalt cement or mineral aggregate will be made.

3.0 Basis of Payment.

3.1 The asphalt cement content assumed for each bituminous mixture is given below. Due to possible variations from that given below and what is actually used in the field, the contact unit price for each mixture used for resurfacing will be adjusted to reflect the actual asphalt cement content used during construction, as indicated on the approved job mix, by the following equation:

Adjusted Contract Unit Price = CP + [AF x (AAC - CAC)] /100

where, CP = Contract Unit Price
AF = Adjustment Factor ($/ton)
AAC = Actual Asphalt Cement Content (%)
(Based upon mix design used during construction)
CAC = Contract Asphalt Cement Content (%)

Type of Mix % Asphalt Cement Adjustment Factor

(Data to be inserted by designer)

3.2 Adjustment to the contract unit price of any mixture for smoothness will be made after adjusting the contract unit price for asphalt cement content.

Job Special Provision

Job:

Title: Payment of Bituminous Mixtures by Square Yard

Name: PBMSY

ID Number: DSP-98-10

First Effective Bid Opening Date: 10/98

Last Effective Bid Opening Date:

Revision Date: 06/11/98

Explanatory Notes: For preliminary estimating purposes, use an adjustment factor of $150.70/ton for mixes with PG 64-22 or PG 58-22; $213.70/ton for mixes with PG 70-22, PG 64-28 and PG 58-34; $219.70/ton for mixes with PG 70-28 or PG 76-22; and $255.70/ton for mixes with PG 76-28. These factors, as well as the factors provided in Figure 6-07.1 of the PPDM for each mix, are statewide averages. The factors to be inserted by the designer into the table under Sec 4.1 of this special provision should reflect current asphalt cement costs and the best estimate for the asphalt cement content for each specific mix to be used on the project. Costs for each performance grade asphalt cement are readilly available through the district or can be requested from the support center Design Division. Mix designs have been established for most rock formations and the designer should request specific factor recommendations from district material personnel. Great effort should be taken to insure the costs and asphalt cement contents inserted into this provision are accurate as possible. Eroneous factors could result in significant costs to the contractor or department.

Conversion factor = Thickness (converted to yards) x Ton/Cu Yd factor for total mix (given in PPDM Figure 6-07.1 for preliminary estimates, but for final estimation and plans, obtain factor from district materials personnel).

Units: English

Section: 0403 - Asphaltic Concrete Pavement

PAYMENT OF BITUMINOUS MIXTURES BY SQUARE YARD

1.0 Scope. All bituminous mixtures used in the construction of full depth pavements on this project will be paid for by the square yard. The quantities shown for each bituminous mixture reflect the total square yards of pavement surface as computed and shown on the plans. No additional payment will be made for construction of the required 1:1 slope along the edge of the pavement. This provision does not replace, but provides additional requirements to Sections 301, 401 and 403 of the Standard Specifications.

2.0 Tolerance in Pavement Thickness. The pavement shall be constructed in accordance with the thickness shown on the plans. The thickness of the pavement will be measured, and where any pavement is found deficient in thickness, deductions for or removal of thin pavement will be made in accordance to Section 4.0 of this provision.

2.1 The contractor shall be responsible to insure all lifts are of adequate thickness to provide the total thickness shown on the plans. The contractor will be allowed to adjust the thickness from that shown on the plans for the lifts below the surface lift, provided the minimum and maximum lift thicknesses allowed for a specific mix is not exceeded.

2.2 The thickness of the pavement will be determined by average caliper measurement of cores in accordance with the procedure established by the Commission.

2.3 For the purpose of determining the constructed thickness of the pavement, cores will be taken by the engineer only after placement of the final surface wearing lift. The cores will be taken at random intervals in each traffic lane at the rate of 1 core per 1000 feet or increment thereof. In addition, cores will be taken at all locations where thickness measurements taken during construction indicate a thickness deficiency sufficient to justify a deduction from the contract unit price, or at any other locations as may be determined by the engineer. If the measurement of any core indicates either the total pavement thickness is deficient in excess of 2/10 inch or the asphaltic concrete wearing surface course is deficient in thickness from the plan thickness, additional cores will be taken at 30-foot intervals parallel to center line ahead and back of the affected location until the extent of the deficiency has been determined.

2.4 It will be assumed that each core is representative of the pavement thickness for a distance extending one-half the distance to the next core, measured along center line, or in the case of a beginning or ending core, the distance will extend to the end of the pavement.

2.5 The drilling of cores in irregular areas, or on projects involving less than 2500 square yards of bituminous pavement, may be waived by the engineer. In this case the designed thickness will be considered as the measured thickness.

2.6 Cores may be waived by the engineer for full depth bituminous shoulders if the shoulders were placed during the same passes as a travelway lane and are 4 feet or less in width.

2.7 The contractor may require check cores to verify thicknesses determined by the engineer. All costs of check core drilling shall be borne by the contractor, unless the check cores indicate that the engineer's measurement would have erroneously resulted in deductions for, or removal of, thin pavement, then the cost of drilling the check cores will not be charged to the contractor.

3.0 Method of Measurement. Pavement areas will be computed to the nearest 1/10 square yard. Final measurement of the completed pavement will not be made except for authorized changes during construction, or where appreciable errors are found in the contract quantity. The revision or correction will be computed and added to or deducted from the contract quantity.

4.0 Basis of Payment.

4.1 The asphalt cement content assumed for each bituminous mixture is given below. Due to possible variations from that given below and what is actually used in the field, the contract unit price for each mixture will be adjusted to account for the actual asphalt cement content used during construction, as indicated on the approved job mix, by the following equation:

Adjusted Contract Unit Price = CP + [CF x (AAC - CAC) x AF] /100

where, CP = Contract Unit Price
CF = Conversion Factor from tons/cubic yards to tons/square yards of Mix
AAC = Actual Asphalt Cement Content (%)
(Based upon approved mix design used during construction)
CAC = Contract Asphalt Cement Content (%)
AF = Adjustment Factor ($/ton)

Type of Mix Thickness % Asphalt Cement Conversion Factor Adjustment Factor
(Data to be inserted by designer)

Example:
IC 1 3/4 inch 4.5 0.0958 ton/s.y. $204/ton
PMBP 1 3/4 inch 4.9 0.0966 ton/s.y. $150/ton
PMBB 12 1/4 inch 4.7 0.6822 ton/s.y $150/ton
PMBB 10 1/4 inch 4.7 0.5709 ton/s.y. $150/ton

4.2 Sections of any asphaltic concrete wearing surface course determined to be less than the thickness shown on the plans shall be removed and replaced by the contractor. Sections of any core measurement of the total pavement thickness, including shoulders, determined to be deficient more than one inch from the thickness shown on the plans shall be removed by the contractor to a depth as specified by the engineer and replaced with one of a satisfactory quality and thickness which, when accepted, will be included in the pay quantity. No payment will be made for any costs incurred by the contractor in removing and replacing pavement deficient in thickness. This will be applied to any section of pavement 30 feet or greater in length, extending from the edge of the pavement to a longitudinal joint or between longitudinal joints in that section of pavement in which the deficient measurement was found.

4.3 If any core measurement of the total pavement thickness is deficient less than one inch, the contractor shall have the option of removing and replacing the pavement at the contractor's expense or of leaving the pavement in place and receiving the following deductions in payment.

Deductions
Deficiency in Thickness Percent of Contract Unit Price

Travelway	Shoulder
0 inch to 2/10 inch	None None
Over 2/10 inch and not over 4/10 inch	15 None
Over 4/10 inch and not over 6/10 inch	60 15
Over 6/10 inch and less than 1 inch	100 60

The above deductions will be applied to any section of pavement 30 feet or greater in length, extending from the edge of the pavement to a longitudinal joint or between longitudinal joints in that section of pavement in which the deficient measurement was found. Deductions for deficient thickness or damaged pavement may be entered on any estimate after the information becomes available.

4.3.1 If the engineer determines any pavement which is deficient in thickness in excess of 6/10 inch may seriously impair traffic service of the pavement, the contractor will be required to remove the pavement to a depth as specified by the engineer and to replace it with one of a satisfactory quality and thickness which, when accepted, will be included in the pay quantity. No payment will be made for any costs incurred in the removal and the replacement of the pavement deficient in thickness. If, in the judgment of the engineer, there is no probability of immediate failure of pavement deficient in thickness in excess of 6/10 inch but less than one inch, the engineer may allow the contractor the choice of leaving the deficient pavement in place and receiving a deduction in payment as stated above or of removing and replacing the pavement as provided herein.

4.4 When removing asphaltic concrete pavement, no partial removal of any individual bituminous layer will be allowed. If the deficient pavement is between the edge of the pavement and a longitudinal joint, removal shall extend from the edge of the pavement to 6 inches beyond the longitudinal joint. When the deficient pavement is between two longitudinal joints, removal shall extend to 6 inches beyond each side of the longitudinal joints. Removal shall extend to each side of the deficient measurement until no portion of the exposed cross sections is more than 2/10 inch deficient, except that there shall not be less than 15 feet of pavement removed. If there remains less than 15 feet of acceptable pavement between the section that has been removed and a transverse expansion or construction joint, the contractor shall remove the pavement to 6 inches beyond the joint.

4.5 No additional compensation will be allowed for any excess thickness.

4.6 The accepted quantities of bituminous mixtures will be paid for at the contract unit price for each mixture with proper allowance made for any deductions for deficiency in thickness or smoothness.

4.7 When paving widths are greater than the travel lane widths, profiling and payment for profiling will apply to the traffic lane design driving width only, normally 12 feet. Random lane coring for thickness or required lane replacement will include the full paved lane width to the longitudinal joints or edge of shoulder, whichever is first.

4.8 Adjustment to the contract unit price of any mixture for smoothness will be be made after adjusting the contract unit price for asphalt cement content.

Job Special Provision

Job:

Title: Payment of Bituminous Mixtures by Square Meters

Name: PBMSM

ID Number: DSP(M)-98-11

First Effective Bid Opening Date: 10/98

Last Effective Bid Opening Date:

Revision Date: 06/11/98

Explanatory Notes: For preliminary estimating purposes, use an adjustment factor of $166/Mg for mixes with PG 64-22 or PG 58-22; $235.50/Mg for mixes with PG 70-22, PG 64-28 and PG 58-34; $242/Mg for mixes with PG 70-28 or PG76-22; and $281.80/ton for mixes with PG76-28. These factors, as well as the factors provided in Figure 6-07.1 of the PPDM for each mix, are statewide averages. The factors to be inserted by the designer into the table under Sec 4.1 of this special provision should reflect current asphalt cement costs and the best estimate for the asphalt cement content for each specific mix to be used on the project. Costs for each performance grade asphalt cement are readilly available through the district or can be requested from the support center Design Division. Mix designs have been established for most rock formations and the designer should request specific factor recommendations from district material personnel. Great effort should be taken to insure the costs and asphalt cement contents inserted into this provision are accurate as possible. Eroneous factors could result in significant costs to the contractor or department.

Conversion factor = Thickness (meters) x Mg/m3 factor for total mix (given in PPDM Figure 6-07.1 for preliminary estimates, but for final estimation and plans, obtain factor from district materials personnel.)

Units: Metric

Section: 0403 - Asphaltic Concrete Pavement

PAYMENT OF BITUMINOUS MIXTURES BY SQUARE METER

1.0 Scope. All bituminous mixtures used in the construction of full depth pavements on this project will be paid for by the square meter. The quantities shown for each bituminous mixture reflect the total square meters of pavement surface as computed and shown on the plans. No additional payment will be made for construction of the required 1:1 slope along the edge of the pavement. This provision does not replace, but provides additional requirements to Sections 301, 401 and 403 of the Standard Specifications.

2.0 Tolerance in Pavement Thickness. The pavement shall be constructed in accordance with the thickness shown on the plans. The thickness of the pavement will be measured, and where any pavement is found deficient in thickness, deductions for or removal of thin pavement will be made in accordance to Section 4.0 of this provision.

2.1 The contractor shall be responsible to insure all lifts are of adequate thickness to provide the total thickness shown on the plans. The contractor will be allowed to adjust the thickness from that shown on the plans for the lifts below the surface lift, provided the minimum and maximum lift thicknesses allowed for a specific mix is not exceeded.

2.2 The thickness of the pavement will be determined by average caliper measurement of cores in accordance with the procedure established by the Commission.

2.3 For the purpose of determining the constructed thickness of the pavement, cores will be taken by the engineer only after placement of the final surface wearing lift. The cores will be taken at random intervals in each traffic lane at the rate of 1 core per 300 m or increment thereof. In addition, cores will be taken at all locations where thickness measurements taken during construction indicate a thickness deficiency sufficient to justify a deduction from the contract unit price, or at any other locations as may be determined by the engineer. If the measurement of any core indicates either the total pavement thickness is deficient in excess of 5 mm or the asphaltic concrete wearing surface course is deficient in thickness from the plan thickness, additional cores will be taken at 10 m intervals parallel to center line ahead and back of the affected location until the extent of the deficiency has been determined.

2.4 It will be assumed that each core is representative of the pavement thickness for a distance extending one-half the distance to the next core, measured along center line, or in the case of a beginning or ending core, the distance will extend to the end of the pavement.

2.5 The drilling of cores in irregular areas, or on projects involving less than 2000 m^2 of bituminous pavement, may be waived by the engineer. In this case the designed thickness will be considered as the measured thickness.

2.6 Cores may be waived by the engineer for full depth bituminous shoulders if the shoulders were placed during the same passes as a travelway lane and are 1.2 m or less in width.

2.7 The contractor may require check cores to verify thicknesses determined by the engineer. All costs of check core drilling shall be borne by the contractor, unless the check cores indicate that the engineer's measurement would have erroneously resulted in deductions for, or removal of, thin pavement, then the cost of drilling the check cores will not be charged to the contractor.

3.0 Method of Measurement. Pavement areas will be computed to the nearest 0.1 square meter. Final measurement of the completed pavement will not be made except for authorized changes during construction, or where appreciable errors are found in the contract quantity. The revision or correction will be computed and added to or deducted from the contract quantity.

4.0 Basis of Payment.

4.1 The asphalt cement content assumed for each bituminous mixture is given below. Due to possible variations from that given below and what is actually used in the field, the contract unit price for each mixture will be adjusted to account for the actual asphalt cement content used during construction, as indicated on the approved job mix, by the following equation:

Adjusted Contract Unit Price = CP + [CF x (AAC - CAC) x AF] /100

where, CP = Contract Unit Price
CF = Conversion Factor from Mg/m^3 to Mg/m^2 of Mix
AAC = Actual Asphalt Cement Content (%)
(Based upon approved mix design used during construction)
CAC = Contract Asphalt Cement Content (%)
AF = Adjustment Factor ($/Mg)

Type of Mix	Thickness	% Asphalt Cement	Conversion Factor	Adjustment Factor
		(Data to be inserted by designer)		

Example:

IC 45 mm 4.5 0.1058 Mg/m^2 $225/Mg
PMBP 45 mm 4.9 0.1065 Mg/m^2 $165/Mg
PMBB 305 mm 4.7 0.7259 Mg/m^2 $165/Mg
PMBB 255 mm 4.7 0.6069 Mg/m^2 $165/Mg

4.2 Sections of any asphaltic concrete wearing surface course determined to be less than the thickness shown on the plans shall be removed and replaced by the contractor. Sections of any core measurement of the total pavement thickness, including shoulders, determined to be deficient 25 mm or more from the thickness shown on the plans shall be removed by the contractor to a depth as specified by the engineer and replaced with one of a satisfactory quality and thickness which, when accepted, will be included in the pay quantity. No payment will be made for any costs incurred by the contractor in removing and replacing pavement deficient in thickness. This will be applied to any section of pavement 10 m or greater in length, extending from the edge of the pavement to a longitudinal joint or between longitudinal joints in that section of pavement in which the deficient measurement was found.

4.3 If any core measurement of the total pavement thickness is deficient less than 25 mm, the contractor shall have the option of removing and replacing the pavement at the contractor's expense or of leaving the pavement in place and receiving the following deductions in payment.

Deductions
Deficiency in Thickness Percent of Contract Unit Price
Travelway Shoulder
0 mm to 5 mm None None
Over 5 mm and not over 10 mm 15 None
Over 10 mm and not over 15 mm 60 15
Over 15 mm and less tha 25 mm 100 60

The above deductions will be applied to any section of pavement 10 m or greater in length, extending from the edge of the pavement to a longitudinal joint or between longitudinal joints in that section of pavement in which the deficient measurement was found. Deductions for deficient thickness or damaged pavement may be entered on any estimate after the information becomes available.

4.3.1 If the engineer determines any pavement which is deficient in thickness in excess of 15 mm may seriously impair traffic service of the pavement, the contractor will be required to remove the pavement to a depth as specified by the engineer and to replace it with one of a satisfactory quality and thickness which, when accepted, will be included in the pay quantity. No payment will be made for any costs incurred in the removal and the replacement of the pavement deficient in thickness. If, in the judgment of the engineer, there is no probability of immediate failure of pavement deficient in thickness in excess of 15 mm but less than 25 mm, the engineer may allow the contractor the choice of leaving the deficient pavement in place and receiving a reduction in payment as stated above or of removing and replacing the pavement as provided herein.

4.4 When removing asphaltic concrete pavement, no partial removal of any individual bituminous layer will be allowed. If the deficient pavement is between the edge of the pavement and a longitudinal joint, removal shall extend from the edge of the pavement to 150 mm beyond the longitudinal joint. When the deficient pavement is between two longitudinal joints, removal shall extend to 150 mm beyond each side of the longitudinal joints. Removal shall extend to each side of the deficient measurement until no portion of the exposed cross sections is more than 5 mm deficient, except that there shall not be less than 5 m of pavement removed. If there remains less than 5 m of acceptable pavement between the section that has been removed and a transverse expansion or construction joint, the contractor shall remove the

pavement to 150 mm beyond the joint.

4.5 No additional compensation will be allowed for any excess thickness.

4.6 The accepted quantities of bituminous mixtures will be paid for at the contract unit price for each mixture with proper allowance made for any deductions for deficiency in thickness or smoothness.

4.7 When paving widths are greater than the travel lane widths, profiling and payment for profiling will apply to the traffic lane design driving width only, normally 3.6 m. Random lane coring for thickness or required lane replacement will include the full paved lane width to the longitudinal joints or edge of shoulder, whichever is first.

4.8 Adjustment to the contract unit price of any mixture for smoothness will be be made after adjusting the contract unit price for asphalt cement content.

Job Special Provision

Job:

Title: Payment of Bituminous Mixtures by Megagrams

Name: PBMM

ID Number: DSP(M)-98-12

First Effective Bid Opening Date: 10/98

Last Effective Bid Opening Date:

Revision Date: 06/11/98

Explanatory Notes: For preliminary estimating purposes, use an adjustment factor of $166/Mg for mixes with PG 64-22 or PG 58-22; $235.50/Mg for mixes with PG 70-22, PG 64-28 and PG 58-34; $242/Mg for mixes with PG 70-28 or PG76-22; and $281.80/ton for mixes with PG76-28. These factors, as well as the factors provided in Figure 6-07.1 of the PPDM for each mix, are statewide averages. The factors to be inserted by the designer into the table under Sec 3.1 of this special provision should reflect current asphalt cement costs and the best estimate for the asphalt cement content for each specific mix to be used on the project. Costs for each performance grade asphalt cement are readilly available through the district or can be requested from the support center Design Division. Mix designs have been established for most rock formations and the designer should request specific factor recommendations from district material personnel. Great effort should be taken to insure the costs and asphalt cement contents inserted into this provision are accurate as possible. Eroneous factors could result in significant costs to the contractor or department.

Units: Metric

Section: 0403 - Asphaltic Concrete Pavement

PAYMENT OF BITUMINOUS MIXTURES BY MEGAGRAMS

1.0 Scope. All bituminous mixtures used in resurfacing existing pavements and shoulders on this project will be paid for by mix type, not by components of each mix. This provision modifies only as stated herein the method of measurement and basis of payment, and does not alter any other requirements set forth in Sections 301, 401, 402 or 403 of the Standard Specifications for the bituminous mixtures used for resurfacing.

2.0 Method of Measurement. The mass of the mixture will be determined in accordance with Section 403.23.1 of the standards specifications, to the nearest 0.1 megagram for the total quantity used in the accepted work. No separate measurement for the mass of asphalt cement or mineral aggregate will be made.

3.0 Basis of Payment.

3.1 The asphalt cement content assumed for each bituminous mixture is given below. Due to possible variations from that given below and what is actually used in the field, the contact unit price for each mixture used for resurfacing will be adjusted to reflect the actual asphalt cement content used during construction, as indicated on the approved job mix, by the following equation:

Adjusted Contract Unit Price = CP + [AF x (AAC - CAC)] /100

where, CP = Contract Unit Price
AF = Adjustment Factor ($/Mg)
AAC = Actual Asphalt Cement Content (%)
(Based upon mix design used during construction)
CAC = Contract Asphalt Cement Content (%)

Type of Mix % Asphalt Cement Adjustment Factor

(Data to be inserted by designer)

3.2 Adjustment to the contract unit price of any mixture for smoothness will be made after adjusting the contract unit price for asphalt cement content.